DOI: 10.66069/ojspub.1137261009

Research on Intelligence Teaching of Higher Mathematics

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Abstract: ***This paper introduces the problems existing in the traditional higher mathematics teaching, and gives the construction of the higher mathematics wisdom course by using the rain classroom platform, including the construction of the higher mathematics knowledge map, the design of the wisdom teaching process and the wisdom teaching evaluation.***

Keywords: Higher Mathematics, Knowledge map, Wisdom teaching, Rain classroom**.**

1. Introduction

In recent years, the development of education in the context of artificial intelligence is very rapid, laying the foundation for the development of traditional teaching to intelligent teaching. Higher education should follow this trend. At the beginning of 2025, the Central Committee of the Communist Party of China and the State Council issued the "Outline of the Construction of an Education Powerful Country (2024-2035)", which once again emphasizes the use of digital technology to enable education and promote the realization of large-scale teaching and innovative teaching [1]. From the information policy issued by the state in recent years, "artificial intelligence+education" has become a new direction of China's education development, and the application of artificial intelligence technology to education has become a research hotspot. Zong Gaofeng and others put forward the idea of optimizing the design of the curriculum system of the financial mathematics undergraduate specialty based on "innovation-driven, number intelligence-enabled", and constructed a three-dimensional teaching system of "classroom, laboratory and social practice" [2]. Starting from the present situation of mathematics teaching in higher vocational education, Yuan Mingxia probed into the design of wisdom teaching link [3]. Du Binbin, aiming at the problems in four aspects of higher mathematics curriculum, combined with the function of wisdom teaching tools (taking "rain classroom" as an example), discussed the concrete application of wisdom teaching tools in the teaching of higher mathematics curriculum, and gave the solution based on wisdom teaching tools [4]. Wang Lei et al put forward the integrated wisdom teaching mode based on MOOC+SPOC+ rain classroom live broadcast." Taking the "Central Limit Theorem" knowledge unit as an example, this paper introduces the concrete teaching design and implementation process under the fusion wisdom teaching mode [5].

2. Problems in Traditional Higher Mathematics Teaching

There are three problems in Traditional Higher Mathematics Teaching as follows:

1) The traditional higher mathematics classroom has long adopted the unified and standardized class teaching mode, and the teaching process shows obvious characteristics of homogeneity. In the whole teaching process, teachers carry out teaching according to the unified syllabus, teaching progress and after-class exercise resources, and impart undifferentiated knowledge to all students, without fully considering the differences in mathematical foundation, thinking acceptance speed and knowledge mastery between students. For the students with weak foundation, the unified teaching rhythm is too fast, it is difficult to digest the abstract mathematical concepts and complex derivation process in time, and the knowledge loopholes are constantly accumulated; for the students with good foundation and strong learning ability, the solidified teaching content and basic exercises can not meet the learning needs of their promotion, resulting in the students' learning potential is difficult to fully tap, and the overall teaching cannot achieve teaching according to their aptitude.

2) In the aspect of knowledge system construction, there is a significant knowledge fragmentation problem in traditional higher mathematics teaching. The content of the textbook is arranged linearly according to the fixed chapter order, and the teacher's teaching mostly uses a single knowledge point as a unit to explain section by section, and disassembles the complete high-number knowledge system into definitions, theorems, formulas and problem types that are separated from each other. In the process of teaching, it often focuses on the knowledge points of the current chapter, lacks the systematic combing of the inner logic, hierarchical relationship and system framework of the front and rear knowledge, and fails to clearly show the connection logic, progressive relationship and comprehensive application scenarios between the knowledge points to the students. This leads to the state that the students' acquired knowledge is scattered and isolated, can not establish a complete knowledge framework of higher mathematics, and it is difficult to understand the core logic of the curriculum from a holistic perspective, and it is often impossible to start when facing comprehensive and compound mathematical problems.

3) From the perspective of classroom teaching mode, the traditional teaching of high mathematics has always taken the teacher's teaching as the absolute core, the classroom subject is highly concentrated at the teacher level, and the students have long been in the subordinate position of passive listening and passive receiving knowledge. Most of the teaching

process is one-way explanation of the definition of the teacher, theorem deduction and example calculation, students follow the rhythm of the classroom mechanical notes, imitation of problem solving ideas, lack of independent thinking, active questioning and independent inquiry learning space. The form of classroom interaction is relatively simple and superficial, mostly shallow interaction of teachers' questions and students' simple responses, lack of deep discussion and speculative communication between teachers and students, students and students, aiming at mathematical difficulties, solving ideas, knowledge logic, it is difficult to stimulate students' active learning awareness, and can not achieve effective collision at the thinking level.

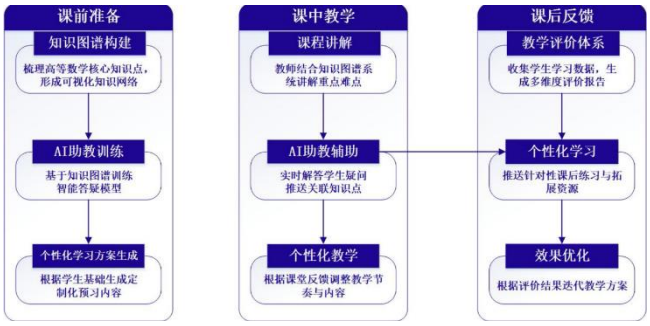
3. The Construction of Higher Mathematics Wisdom Course Under the Platform of Rain Classroom

3.1 Constructing Knowledge Map of Higher Mathematics

First of all, teachers combined with the syllabus of higher mathematics, curriculum difficulties and professional training needs, all the teaching content of the high number of hierarchical decomposition, refining the first level of core knowledge nodes, including functions and limits, monadic function differential calculus, monadic function integral calculus, multivariate function calculus, infinite series, ordinary differential equations six core modules. On this basis, each first-level node is subdivided into two-level and three-level subdivision knowledge points, for example, the differential calculus of one-variable function is decomposed into sub-nodes such as derivative definition, derivative rule, higher-order derivative, differential, derivative application, etc., and the auxiliary knowledge units such as definition, theorem, formula, problem type, error-prone point are clarified. At the same time, the system combs the inherent logic relation of each knowledge point, distinguishes the inclusion relation, the progressive relation, the juxtaposition relation and the causality relation, makes clear the pre-basic knowledge point and the follow-up expansion knowledge point, and establishes the logic foundation for the construction of the knowledge graph. After the completion of the knowledge sorting and classification, relying on the lesson preparation management module of the wisdom teaching platform in the rain classroom, the overall framework of the higher mathematics visual knowledge map is built. Teachers log on the teacher side of the rain classroom, create the class and curriculum resources database of the exclusive course of higher mathematics, use the self-defined catalog of the platform and the editing function of the knowledge structure, according to the knowledge hierarchy structure combed in the early stage, enter the core knowledge nodes and subdivided knowledge points in turn, and build the main framework of the visual knowledge map with clear and logical coherence. Distinguishing from the traditional text catalogue, this chart presents a complete knowledge system of high numbers in the form of structure and graphics, clearly shows the subordination and connection logic of each module and each knowledge point, and solves the problem of scattered traditional teaching knowledge and fuzzy system.

3.2 Wisdom Teaching Process

Mainly divided into pre-class, class, after-class three stages. Relying on the wisdom teaching platform and knowledge map before class, according to the calculus teaching outline, personalized preview tasks are formulated for students, and learning resources, learning tasks and curriculum goals of this class are sent using the artificial intelligence working platform in the rain classroom; students learn independently through the knowledge map to complete the pre-class tasks issued by the teacher. In the class, the teacher carries on the course difficulty explanation, with the artificial intelligence work platform as the support, carries on the interactive, the accurate teaching, through the real-time answer question, the online feedback and so on function, dynamically grasps the student classroom study condition, concentrates the explanation to the common question, aims at the individuality question accurate guidance, melts into the stratified interaction task, takes into account the different student study rhythm. After class, based on classroom learning data, AI teaching assistants carry out precision coaching, realize online intelligent question and answer, and artificial intelligence platforms carry out resource recommendations (video resources, exercise resources, etc.), form personalized learning paths, and help students complete personalized learning. Relying on the whole process of teaching data detection and statistical analysis of the artificial intelligence working platform in the rain classroom, it can check the students' knowledge points, feedback the target achievement data, generate the students' portraits, realize the accurate evaluation of students' learning, and complete the detection of the wisdom teaching effect.



3.3 Intelligence Teaching Evaluation

Relying on the rain classroom, the whole course evaluation system of online and offline integration is constructed, and the accurate disassembly of knowledge points and the diagnosis of learning situation are realized by combining the knowledge map. Pre-class push task, students through the knowledge map for independent learning, to complete the teacher issued pre-class task, the system of evaluation data. In the course of real-time answer questions, interactive tests and other process evaluation, after class combined with online homework and offline performance, relying on the knowledge map to locate students' knowledge weakness, generate personalized learning feedback and improvement path. At the end of the period, the process and finality results are summed up according to preset weights, forming a closed-loop evaluation that can be quantified, traced, accurate and personalized, and feeding back teaching with data.

4. Summary

Under the background of the popularization of wisdom education, the teaching mode of wisdom based on rain

classroom and knowledge map realizes the deep integration of technology, resources, knowledge and classroom, effectively improves the teaching quality and educational effect of higher mathematics course, provides a feasible practical path and reference pattern for the digital and intelligent teaching reform of public basic courses in colleges and universities, and has good popularization value and application prospect.

Acknowledgements

This work was supported by the Beijing Union University educational reform project “Research and Practice of Smart Teaching in Advanced Mathematics Based on Rain Classroom” (Project No. JJ2026Y043).

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